CARLETON UNIVERSITY
Ontario Universities Program in Field Biology

Course Title:	**Canadian Scientific Research Diver**
Instructor(s):	Dr. Nigel Waltho Dept. Biology, Carleton University Phone: 613-297-6422 Email: nigel.waltho@carleton.ca
Dates:	July 26 – Aug 11th, 2019
Location:	Queen's University Biological Station (QUBS), Elgin, ON (½ hr north of Kingston)
Cost:	**Course Fees**: $2595 includes room & board, 25 scuba tank fills, daily boat transport. Payable as **$350 non-refundable deposit** to your home university, and $**2245 balance** to Carleton University. The balance is due by **June 1st** payable by cheque to: **Carleton University 814308-189022** The cheques should be mailed to: Ruth Hill-Lapensee, Dept. Biology, Carleton University, 1125 Colonel By Dr, Ottawa, ON K1S 5B6. **Equipment**: students *must* provide their own complete set of cold-water dive gear (e.g., two-week rental/purchase) including a dive knife, dive light, dive watch, and dive compass. **Textbook/eText**: NOAA Diving Manual for Science & Technology 6th Ed. Best Publishing **Scuba Diver's Insurance**: each student must have DAN membership & Scuba Insurance.
Prerequisites:	**Academics**: students should be entering their 3rd or 4th year of a Biology, Env. Sci., or similar program; and have at least (a) one advanced ecology course beyond the Introductory level, and (b) one biometry or statistics course **Scuba**: students must possess a nationally recognized SCUBA certification; and have at least 5 open water dives with at least 2.5 hours logged bottom time **Medical**: students must be declared medically fit by a licensed physician trained in diving medicine (e.g., see list of Diving Physicians)
Enrolment:	6 (0) 4 students minimum
Course Description (brief):	Scientific diving whether in Canada or around the world requires additional knowledge and training above and beyond the sport diver. In Canada (except ON) scientific diving falls under the Canadian Association of Underwater Scientists (CAUS). This course requires: • self-study and review of the NOAA textbook with completion of several on-line tests *before* the two-week field/scuba portion begins • a two-week 25-dive/15hr-dive time scuba course including: o dive rescue & accident management techniques o navigation, deep, cold water, low visibility, tethered, and night diving o scientific diving techniques such as benthic core sampling, quadrat sampling, fish surveys, habitat mapping, video transects, and underwater photography • evening sessions during the two-week field course include diving regulations, advanced diving physics and physiology lectures, species identification workshops, experimental design and statistical workshops, student presentations, and opportunistic guest presentations (e.g., Environment Canada)
Evaluation:	• NOAA on-line and lecture-based quizzes/tests (10%) • field effort – including safe dive-site management & diving practices, and initiative & industriousness (10%) • student presentations (10%) • final paper/research proposal, due Sept 30th (70%)

Deadline to apply is **Feb 8, 2019.**
If interested please complete the application form and submit it to the OUPFB course coordinator at your school.
Deposit of $350 is due at the time of registration.

Tuition at your home institution is *in addition* to any field module costs.

Students who drop a field course should not expect a refund of any field course costs.

Students are encouraged to purchase cancellation insurance if airline tickets are required.

Students are responsible for all fees incurred by the home or host university due to any bounced cheque.

An Average Day – What to Expect

(a) Daily timeline	• pre-breakfast → dive gear, boat, safety checklists, gear assembled and ready for boat departure • 07:30-08:30 → breakfast & cleanup • 08:30-11:30 → scientific dive training • 12:00-13:00 → lunch and cleanup • 13:30-17:00 → scientific dive training • 17:30-18:30 → dinner and cleanup • 19:30-23:00 → dive lectures, student presentations, and scientific methodology/statistics workshops
(b) Work habitat & Physical exertion, (c) Common activities	**Pre-field course:** • students will be expected to study/review select chapters from the NOAA Diving Manual for Science and Technology textbook • student comprehension will be evaluated through on-line quizzes available weekly through June and July. **Swimming & Watermanship:** • The Canadian Association of Underwater Scientists (CAUS) require students to be competent in the water. This competency includes: o without aids treading water for 20min., and swimming for 200m o with mask, fins, and snorkel a 400m swim; and able to tow a fully dressed scuba diver 100m **Scuba:** • the first week of the course we'll be diving morning and afternoon on L. Opinicon. This lake is shallow (i.e., 20') so for the most part we'll be above the thermocline or at it's interface. The goal this first week is to maximize the required 15 hrs bottom time. The water may seem warm the first few days, but with slow creep hypothermia you'll be wearing your full winter wetsuit (e.g., rental, or drysuit if you have one) by week's end. Good eating, staying hydrated, and solid sleeps are key to mental and physical stamina through this first week. • the second week we'll be diving above Chaffey's Locks in Indian and possibly Clear lake. These lakes are deeper (e.g., 40-100'), well below the thermocline – complete full thickness wetsuits (e.g., rental, or drysuit if you have one) are mandatory. Albeit these second week dives will be shorter in duration, we'll use this second week to maximize the required 25-dive count. Slow-creep hypothermia can be avoided by keeping warm, eating well, staying hydrated, and having good sleeps. • probable but rare additional diving issues include: o sinus squeezes → don't dive if you have a cold o middle-ear barotrauma → easily avoidable with slow descents and proper ear-clearing techniques that we'll practice and stress repeatedly o equipment failure (e.g., second stage free-flow) → such failures we'll practice contingency actions for, and train for these scenarios repeatedly • the 25-dive pedagogy is structured to initially review and train in core diving skills and dive accident management, and to then further these basics along two independent trajectories with the focus on dive safety and competency in: o increasingly challenging dive environments (i.e., from shallow warm waters with good visibility, to black-out conditions at the colder deeper depths) o scientific methods and equipment (e.g., benthic core sampling, quadrat sampling, fish surveys, habitat mapping, video transects, and underwater photography). **Evening lectures:** • after dinner, most evenings we'll have 3hr academic lectures (e.g., diving physics, physiology, statistical techniques), equipment workshops, student presentations, or similar. Students seem to struggle through these at times, especially in the absence of good eating, staying hydrated, and having solid sleeps.
(d) Weather, dehydration, & biting insects	**Weather:** • average daily high temperatures are approx. 26°C; and average nighttime low temperatures are 18°C. However, a hot spell could put us well into the 30-35°C plus temperatures; a cold wet spell can drop us to the low teen's. • during the day we'll be out on the boats, exposed to all weather conditions. On consecutive hot sunny days dehydration, sun burn, heat exhaustion are valid concerns. On cold windy wet days slow-creep hypothermia and the inability to get warm/dry are valid concerns. Bring water bottles, clothing layers and duplicates as required, hats, and polarized sun glasses if you have such. **Bugs:** • mosquitoes, deer, and horse flies are expected. Avoid scented soaps/shampoos. Appropriate clothing may be a better utility versus bug dope (especially when diving, you don't want the bug dope running into your eyes)
(e) Toxic/poisonous, wildlife/ plants	• Ticks & Lyme disease, and poison ivy may be present along the trails between buildings. Long clothing will minimize the risk • Zebra mussels may cover the rock substratum. Careful manoeuvring and buoyancy control will minimize cuts
(f) Sleeping, washroom & laundry facilities	• students typically share a room (gender specific) with another student(s) depending on the cabin allocated (see https://qubs.ca/facilities/accommodations) • students need to bring their own linen/sleeping bags/pillows • coin-operated washing/drying faciliites are available
(g) Meal plans & food allergies	• all meals are prepared by kitchen staff, served buffet-style in the main dining hall • meals are prepared with the provision of a balanced, healthy diet in mind. • normally, vegetarian meals are interspersed with the regular menu. Alternatives to meats are generally available for strict vegetarians. Dietary preferences and food allergies will be requested prior to your arrival on-site and will be accommodated as best as possible.

(h) Non-academic responsibilities	• QUBS staff attempt to keep common areas clean and tidy. However, housekeeping in individual accommodations and laboratories is the responsibility of the user. • general-use bathrooms and common areas, students have primary responsibility for housekeeping • simple things like removing outdoor footwear at entrances, carefully wiping your feet and mopping up spills as they happen will greatly assist with keeping QUBS buildings clean and tidy.
(i) Degree of isolation	• see https://qubs.ca/facilities • fundamental services (water supply, septic systems, electrical supply, heat, telephones etc.) are readily available • E-mail and internet are accessible using your own computer linked to the wireless system • First aid kits are readily available. In case of real emergencies call 911; and for diving-specific emergencies similarly call 911 first before the local (Kingston) hyperbaric chamber (or DAN).
(j) Alcohol & drugs	• as we are scuba diving most days, the course will remain alcohol and drug free • transgressions will be evaluated for immediate ejection from the course
(k) Vaccinations/ Insurances	• stubbed toes, scrapped skins are always possible – you should always have your tetanus shot up-to-date • all divers MUST be declared medically fit by a licensed physician trained in diving medicine Diving Physicians • all divers MUST have scuba-specific DAN insurances
(l) Social Situations	• QUBS is an academic institution, and not a holiday resort. Respectful (but casual) clothing is assumed at all times • as divers we'll be dressing on the boat prior to diving, and dressing down thereafter. Courteous behaviour and respectful bathing-suits are assumed • through the second week of the course we'll be travelling by boat through the Rideau system locks (Chaffey's locks). Professional behaviour in these public places is assumed
(m) Final comments	**Canadian Association of Underwater Scientists - CAUS certification:** • this field course centres on the field and academic training required for you to obtain your CAUS Level I Scientific Diver certification. However, to obtain ***actual certification*** specific criteria must be met: o a minimum passing grade of 80% on the written quizzes/tests o within one year of completing this field course, proof of additional certification in First Aid and CPR (generally a weekend course offered by Red Cross, or St. Johns); and certification in Oxygen first aid for Divers (generally a single day-course offered at your local dive store) is required o as a successful CAUS Level I Scientific Diver your scientific research diving is restricted to 20m depth **ACUC Advanced Diver/Rescue Diver Certification:** • at the completion of this field course successful students may ***independently*** ask for their ACUC Advanced Sport Diver and Rescue Diver certifications. o these additional Sport diver certifications are available at an additional $50 each o no further dive training nor exams are required, however, as above a minimum passing grade of 80% is required for the written quizzes/tests o as an Advanced ACUC Sport Diver you will be certified to 30m for recreational sport diving. **At the end of the day…** • at the end of the day, this course is designed along multiple pedological trajectories, each contributing to your growth and maturation in: o dive rescue & accident management techniques o underwater navigation, deep, cold water diving, low visibility, tethered, and night diving o scientific diving techniques such as benthic core sampling, quadrat sampling, fish surveys, habitat mapping, video transects, and underwater photography o research design and statistical analysis of complex ecological data sets